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EXAMINER	
HUNTSINGER, PETER K	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/855,943	MIYAZAKI, TAKAO	
	Examiner	Art Unit	
	Peter K. Huntsinger	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-37 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

DOUGLAS Q. TRAN
PRIMARY EXAMINER

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filled on 26 October 2005 has been entered in full.

2. Based on the applicant's amendment, the objection to claim 32 has been withdrawn.

Response to Argument

3. Applicant's arguments filled on 26 October 2005 have been fully considered but they are not persuasive.

The applicant argues on page 15 of the response in respect to claim 1 that:

Schantz does not print on a sheet, detect whether a print defect occurs on that sheet, and (subsequently) correct the print defect on that same sheet.

a. Schantz does not print, detect, and correct the same specific page of paper, however the claim limitation states printing, detection, and correction occurring on the same recording material. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The applicant argues on page 15 of the response in respect to claim 11 that:

Schantz does not record the row again on the same recording material as the previous recording.

b. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Therefore, Schantz teaches the limitation of printing, detecting, and correcting the same recording material.

The applicant argues on pages 16 and 17 of the response in respect to claim 11 that:

Tanaka does not print, detect, and correct the same recording material.

c. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Therefore, Tanaka teaches the limitation of printing, detecting, and correcting the same recording material.

The applicant argues on pages 17 and 18 of the response in respect to claims 16 and 19 that:

Schantz does not record the row again on the same recording material as the previous recording.

d. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Therefore, Schantz teaches the limitation of printing, detecting, and correcting the same recording material.

The applicant argues on pages 18 and 19 of the response in respect to claims 7 and 8 that:

Tanaka does not record the row again on the same recording material as the previous recording.

e. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Therefore, Tanaka teaches the limitation of printing, detecting, and correcting the same recording material.

The applicant argues on page 20 of the response in respect to claim 24 that:

Schantz does not record the row again on the same recording material as the previous recording.

f. Two separate sheets of paper are considered the same recording material if they are composed of the same type of paper. Therefore, Schantz teaches the limitation of printing, detecting, and correcting the same recording material.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 6, 11, 22, 27, 31, 34, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Schantz U.S. Patent 5,124,720.

Referring to claim 1, Schantz discloses a serial printing method for recording an image on a recording material one line by one line, said line including one or more rows and said line being recorded by moving a recording head in a width direction of said recording material, said serial printing method comprising the steps of: recording said row with said recording head on said recording material (col. 3, lines 16-20); detecting whether or not a print defect occurs on said recorded row on said recording material (col. 3, lines 37-45); and performing correction recording, on said recording material, relative to said row on which said print defect occurs (col. 3, lines 24-34).

Referring to claim 2, Schantz discloses a serial printing method according to claim 1, wherein said line includes a plurality of said rows respectively recorded with recording elements of said recording head (col. 3, lines 65-67).

Referring to claim 6, Schantz discloses a serial printing method according to claim 1, wherein said recording head is an ink-jet recording head for recording said image by jetting ink to said recording material (col. 1, lines 9-10).

Referring to claim 11, Schantz discloses a serial printing method for recording an image on a recording material one line by one line, said line including a plurality of rows of which recording is performed by moving a recording head in a sub-scanning direction which is a width direction of said recording material, and said recording head having a plurality of recording elements arranged in a main-scanning direction perpendicular to said sub-scanning direction, said serial printing method comprising the steps of: recording said rows with said recording head on the recording material (col. 3, lines 16-20); detecting the broken recording element among said recording elements, said

broken recording element being impossible to record due to its failure (col. 3, lines 37-45); and recording said row to be recorded with said broken recording element, by moving said recording head again and by using another normal recording element among said recording elements, wherein recording said row again occurs on the same recording material as the previous recording (col. 3, lines 24-34).

Referring to claim 22, Schantz discloses a serial printing method for recording an image on a recording material one line by one line, said line including one or more rows and said line being recorded by moving a recording head of a printer in a width direction of said recording material, said serial printing method comprising the steps of: discharging said recording material on which said image has been recorded, from said printer (col. 3, lines 37-45); setting said discharged recording material to said printer again (col. 3, lines 24-34); detecting whether or not a print defect occurs on said recorded row (col. 3, lines 37-45); and performing correction recording relative to said row on which said print defect occurs, on said recording material (col. 3, lines 24-34).

Referring to claim 27, Schantz discloses a serial printing method for recording an image on a recording material according to claim 1, wherein both recording the image and correction recording are performed on said recording material where the print defect was detected (col. 3, lines 24-34).

Referring to claim 31, Schantz disclose a serial printing method for recording an image on a recording material according to clam 11, wherein the row to be recorded with the broken recording element is one said recording material, and wherein the

recording head records again with a normal element on said recording material (col. 3, lines 24-34).

Referring to claim 34, Schantz discloses a serial printing method of recording an image on a recording material according to claim 22, wherein the image on said discharged recording material contains a print defect, and wherein said correction recording corrects the image on said discharged recording material (col. 3, lines 24-34).

Referring to claim 36, Schantz discloses a serial printing method for recording an image on a recording material according to claim 1, wherein recording said row, detecting a print defect on said recorded row, and performing correction recording on said row occur during a same recording operation (col. 3, lines 24-34).

6. Claims 11, 13, 14, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Tanaka et al. U.S. Patent 6,123,341.

Referring to claim 11, Tanaka et al. disclose a serial printing method for recording an image on a recording material one line by one line, said line including a plurality of rows of which recording is performed by moving a recording head in a sub-scanning direction which is a width direction of said recording material, and said recording head having a plurality of recording elements arranged in a main-scanning direction perpendicular to said sub-scanning direction, said serial printing method comprising the steps of: recording said rows with said recording head on the recording material (S2 of Fig. 10, col. 12, lines 13-16); detecting the broken recording element among said recording elements, said broken recording element being impossible to

record due to its failure (S4 of Fig. 10, col. 12, lines 20-22); and recording said row to be recorded with said broken recording element, by moving said recording head again and by using another normal recording element among said recording elements, wherein recording said row again occurs on the same recording material as the previous recording (Fig. 12, col. 13, lines 52-59).

Referring to claim 13, Tanaka et al. disclose a serial printing method according to claim 11, wherein said broken recording element is detected by measuring a density of a test pattern recorded by said recording head (Fig. 3, col. 9, lines 1-6).

Referring to claim 14, Tanaka et al. disclose a serial printing method according to claim 13, wherein said test pattern is arranged at a lateral side of said row in said sub-scanning direction (Fig. 3, col. 9, lines 1-6).

Referring to claim 15, Tanaka et al. disclose a serial printing method according to claim 13, wherein said test pattern is arranged at a downstream side of said row in said main-scanning direction (Fig. 3, col. 9, lines 1-6).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 3, 12, 16-21, 23, 28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720 as applied to claims 1, 11, and 22 above, and further in view of Ogata et al. U.S. Patent 5,722,007.

Referring to claim 3, Schantz discloses a serial printing method according to claim 2, wherein said print defect of said row is detected, and said correction recording is performed relative to said pixel (col. 3, lines 37-45). Schantz does not disclose expressly measuring density. Ogata et al. disclose a detector measuring density of a pixel (col. 10, lines 49-51). Schantz and Ogata et al. are combinable because they are in the same field of printer systems. At the time of the invention, it would have been obvious to detect a density with the printer of Schantz. The motivation for doing so would have been to maintain a high image quality by assuring the printing density is consistent. Therefore, it would have been obvious to combine Ogata et al. with Schantz to obtain the invention as specified in claim 3.

Referring to claim 12, Schantz discloses a serial printing method according to claim 11, wherein said broken recording element is detected by measuring said row. Schantz does not disclose expressly measuring density. Ogata et al. disclose a detector measuring density of a pixel (col. 10, lines 49-51). Schantz and Ogata et al. are combinable because they are in the same field of printer systems. At the time of the invention, it would have been obvious to detect a density with the printer of Schantz. The motivation for doing so would have been to maintain a high image quality by assuring the printing density is consistent. Therefore, it would have been obvious to combine Ogata et al. with Schantz to obtain the invention as specified in claim 12.

Referring to claim 16, Schantz discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording material, a recording head held by said carriage, and moving means for moving said recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head having M (M is an integer of two or more) recording elements arranged in said main-scanning direction to record said M rows on said recording material during the movement of said carriage, said serial printer comprising: measuring means attached to said carriage and for obtaining a measurement of said row recorded by said recording head (detector 24 of Fig. 1, col. 3, lines 37-45); failure judging means for judging the row as the defective row when said measurement is less than a prescribed value, said failure judging means judging the corresponding recording element as the broken recording element (col. 3, lines 37-49); and control means for controlling drive of said recording element, reciprocation of said carriage, and movement of said recording material, when all of said recording elements are normal (paper motion control device 24 of Fig. 1, col. 3, lines 59-64), said control means controlling the record under a condition that said recording element is moved every M rows (number of printing elements), and when said failure detecting means detects said broken recording element, said control means controlling the record such that said recording material is moved by at least one row in said main-scanning direction to record with the normal recording element relative to said defective row (col. 3, lines 24-34), and successively the record being continued under a condition that said recording material is moved, in said main-scanning direction, in accordance with a number of the

normal recording elements (col. 5, lines 31-55), wherein on the same recording material, the failure judging means judges the defective row and the control means controls the recording element to record. Schantz does not disclose expressly measuring density. Ogata et al. disclose a detector measuring density (col. 10, lines 49-51). Schantz and Ogata et al. are combinable because they are in the same field of printer systems. At the time of the invention, it would have been obvious to detect a density with the printer of Schantz. The motivation for doing so would have been to maintain a high image quality by assuring the printing density is consistent. Therefore, it would have been obvious to combine Ogata et al. with Schantz to obtain the invention as specified in claim 16.

Referring to claim 17, Schantz discloses a serial printer according to claim 16, wherein when a number of the consecutive normal recording elements is N (N is an integer more than one and less than M), recording is performed with the consecutive normal recording elements, the number of which is N, in a condition that said recording material is moved in said main-scanning direction every N rows (col. 5, lines 31-55).

Referring to claims 18 and 21, Schantz discloses a serial printer according to claim 17, wherein said measuring means includes a light emitting element for illuminating said recorded row, and a light receiving element for converting the reflected light into an electric signal (col. 3, lines 37-45). Ogata et al. disclose measuring density (col. 10, lines 49-51).

Referring to claim 19, Schantz discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording

material, a recording head held by said carriage, and moving means for moving said recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head having M (M is an integer of two or more) recording elements arranged in said main-scanning direction to record said M rows on said recording material during the movement of said carriage, said serial printer comprising: measuring means attached to said carriage and for obtaining a measured said row recorded by said recording head (detector 24 of Fig. 1, col. 3, lines 37-45); failure judging means for judging the row as the defective row when said measurement is less than a prescribed value, said failure judging means judging the corresponding recording element as the broken recording element (col. 3, lines 37-49); and control means for controlling drive of said recording element, reciprocation of said carriage, and movement of said recording material, when all of said recording elements are normal (paper motion control device 24 of Fig. 1, col. 3, lines 59-64), said control means controlling the record under a condition that said recording element is moved every (M-J) rows (J is an integer less than M) to overlap the J rows, and when said failure detecting means detects said broken recording element, said control means controlling the record such that said recording material is moved by at least one row in said main-scanning direction to record with the normal recording element relative to said defective row, and successively the record being continued under a condition that said recording material is moved, in said main-scanning direction, in accordance with a number of the normal recording elements (col. 5, lines 31 –55), wherein on the same recording material, the failure judging means judges the defective row and the control means

controls the recording element to record. Schantz does not disclose expressly measuring density. Ogata et al. disclose a detector measuring density (col. 10, lines 49-51). Schantz and Ogata et al. are combinable because they are in the same field of printer systems. At the time of the invention, it would have been obvious to detect a density with the printer of Schantz. The motivation for doing so would have been to maintain a high image quality by assuring the printing density is consistent. Therefore, it would have been obvious to combine Ogata et al. with Schantz to obtain the invention as specified in claim 19.

Referring to claim 20, Schantz discloses a serial printer according to claim 19, wherein when a number of the consecutive normal recording elements is N (N is an integer more than one and less than M), recording is performed with the consecutive normal recording elements, the number of which is N, in a condition that said recording material is moved in said main-scanning direction every (N-K) rows (K is an integer less than N) to overlap the K rows (col. 5, lines 31 –55).

Referring to claim 23, Schantz discloses detecting a print defect but does not expressly disclose measuring a density of said row. Schantz does not disclose expressly measuring density. Ogata et al. disclose a detector measuring density (col. 10, lines 49-51). Schantz and Ogata et al. are combinable because they are in the same field of printer systems. At the time of the invention, it would have been obvious to detect a density with the printer of Schantz. The motivation for doing so would have been to maintain a high image quality by assuring the printing density is consistent.

Therefore, it would have been obvious to combine Ogata et al. with Schantz to obtain the invention as specified in claim 23.

Referring to claim 28, Schantz discloses a serial printing method for recording an image on a recording material according to claim 3, wherein said print defect is both detected and corrected on said recording material having the lack of pixel density (col. 3, lines 24-34).

Referring to claim 32, Schantz discloses a serial printer including a carriage reciprocated in a sub-scanning direction according to claim 16, wherein said number of normal recording elements is based on a number of consecutive normal recording elements (col. 5, lines 31-55).

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720 as applied to claim 1 above, and further in view of Aosaki et al. U.S. Patent 5,467,198

Schantz discloses a thermal printer (col. 1, lines 9-10) but does not disclose expressly utilizing thermosensitive recording paper. Aosaki et al. disclose wherein said recording material is a thermosensitive recording paper including a thermosensitive coloring layer, and said recording head is a thermal head for recording said image by heating said thermosensitive coloring layer (col. 7, lines 46-53). Schantz and Aosaki et al. are combinable because they are from the same field of printing systems. At the time of the invention, it would have been obvious to utilize the thermosensitive recording paper of Aosaki et al. with the printing system of Schantz. The motivation for doing so

would have been to reduce the size of the printer. Schantz discloses a generic thermal printer, but doesn't provide details of the printer, and Aosaki et al. simply provides the standard details. Therefore, it would have been obvious to combine Aosaki et al. with Schantz to obtain the invention as specified in claim 4.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720 as applied to claim 1 above, and further in view of Saito U.S. Patent 4,561,789.

Schantz disclose a thermal printer (col. 1, lines 9-10) but do not state utilizing thermally melted ink. Saito discloses wherein said recording head is a thermal head for heating an ink ribbon from its back side, said image being recorded by transferring one of thermally melted ink and thermally sublimated ink onto a surface of said recording material (col. 3, lines 12-17). Schantz and Saito are combinable because they are from the same field of printing systems. At the time of the invention, it would have been obvious to utilize the thermally melted ink of Saito with the printing system of Schantz. The motivation for doing so would have been to reduce the printing noise. Schantz discloses a generic thermal printer, but doesn't provide details of the printer, and Saito simply provides the standard details. Therefore, it would have been obvious to combine Saito with Schantz to obtain the invention as specified in claim 5.

11. Claims 7, 8, 10, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. U.S. Patent 6,123,341 and Noyes et al U.S. Patent 6,775,022.

Referring to claim 7, Tanaka et al. disclose a serial printer including a carriage and a recording head held thereby, said carriage being reciprocated in a sub-scanning direction which is a width direction of a recording material, and said recording head recording a predetermined number of rows on said recording material in accordance with image data during the forward movement of said carriage, said serial printer comprising: density measuring means attached to said carriage and for obtaining a measured density of a recorded portion when said carriage is moved (line image sensor 37 of Fig. 9, col. 11, lines 56-57); density predicting means for obtaining a predicted density to be recorded on said portion, based on said image data (check pattern data of image data, col. 12, lines 20-22); operation means for comparing said measured density with said predicted density every portion (S4 of Fig. 10, col. 12, lines 20-22); said operation means obtaining density difference when said measured density is less than said predicted density (Fig. 8, col. 11, lines 39-49); record correcting means for performing correction recording relative to the defective portion having said density difference, said record correcting means reciprocating said carriage again for the defective portion and driving said recording head in accordance with said density difference during the forward movement of said carriage (S17 of Fig. 12, col. 14, lines 20-25); and recording-material advancement means for advancing said recording material in a main-scanning direction perpendicular to said sub-scanning direction, in order to record the next predetermined number of the rows on said recording material (S19 of Fig. 12, col. 14, lines 27-30), wherein on the same recording material, detection of the density difference and correction recording relative to the defective portion having

said density difference are performed. Tanaka et al. does not disclose expressly the density measuring means measuring density when moved backwards. Noyes et al. disclose a carriage capable of measuring density while moving backwards (col. 86, lines 30-34). Tanaka et al. and Noyes et al. are combinable because they are in the same field of printing systems. At the time of the invention it would have been obvious to allow the density to be measuring while the carriage is moving backwards in the system of Tanaka et al. The motivation for doing so would be to allow the printer to utilize only one density measuring means if needed. Therefore, it would have been obvious to combine Noyes et al. with Tanaka et al. to combine the invention as specified in claim 7.

Referring to claim 8, Tanaka et al. disclose a serial printer including a carriage and a recording head held thereby, said carriage being reciprocated in a sub-scanning direction which is a width direction of a recording material, and said recording head recording a predetermined number of rows on said recording material in accordance with image data during the reciprocation of said carriage, said serial printer comprising: density predicting means for obtaining a predicted density to be recorded on said portion, based on said image data (check pattern data of image data, col. 12, lines 20-22); operation means for comparing said measured density with said predicted density every portion, said operation means obtaining density difference of the defective portion having said measured density which is less than said predicted density (S4 of Fig. 10, col. 12, lines 20-33); record correcting means for performing correction recording relative to said defective portion, said record correcting means reciprocating said carriage again for the defective portion and driving said recording head in accordance

with said density difference during the movement of said carriage (S17 of Fig. 12, col. 14, lines 20-25); and recording-material advancement means for advancing said recording material in a main-scanning direction perpendicular to said sub-scanning direction, in order to record the next predetermined number of the rows on said recording material (S19 of Fig. 12, col. 14, lines 27-30), wherein on the same recording material, detection of the density difference and correction recording relative to the defective portion having said density difference are performed. Tanaka et al. does not disclose expressly a first and second density measuring means for measuring density forward and backwards. Noyes et al. disclose first density measuring means disposed on one side of said recording head in said sub-scanning direction, said first density measuring mean obtaining a measured density of a recorded portion just after recording when said carriage is moved forward (photo sensor on 37b of Fig. 4, col. 16-17, lines 66-67, 1-2); second density measuring means disposed on the other side of said recording head in said sub-scanning direction, said second density measuring means (photo sensor on 37a of Fig. 4, col. 16-17, lines 66-67, 1-2) obtaining a measured density of a recorded portion just after recording when said carriage is moved backward (col. 86, lines 30-34). Tanaka et al. and Noyes et al. are combinable because they are in the same field of printing systems. At the time of the invention it would have been obvious to allow the density to be measuring while the carriage is moving backwards in the system of Tanaka et al. The motivation for doing so would be to allow the printer to utilize only one density measuring means if needed. Therefore, it would have been

obvious to combine Noyes et al. with Tanaka et al. to combine the invention as specified in claim 8.

Referring to claim 10, Tanaka et al. and Noyes et al. disclose a serial printer according to claims 7 or 8 but do not specifically state measuring the density of a single pixel. From the definition of a pixel as the smallest unit of resolution, it is inherent that the image sensor of Tanaka et al. would measure pixels.

Referring to claim 29, Tanaka et al. disclose a serial printer according to claim 7, wherein said operation means obtains the density difference on said recording material (line image sensor 37 of Fig. 9, col. 11, lines 56-57), and wherein the record correcting means corrects said density difference on said recording material (S17 of Fig. 12, col. 14, lines 20-25). The detection and correction, while not necessarily occurring on the same sheet of paper, both occur on sheets of paper, which is a recording material.

Referring to claim 30, Tanaka et al. disclose a serial printer according to claim 8, wherein the density difference for the defective portion is measured on said recording material (line image sensor 37 of Fig. 9, col. 11, lines 56-57), and wherein correction recording for the defective portion is performed on said recording material (S17 of Fig. 12, col. 14, lines 20-25). The detection and correction, while not necessarily occurring on the same sheet of paper, both occur on sheets of paper, which is a recording material.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. U.S. Patent 6,123,341 and Noyes et al U.S. Patent 6,775,022 as applied to claims 7 and 8 above, and further in view of Terajima et al. U.S. Patent 6,785,026.

Tanaka et al. and Noyes et al. disclose utilizing a density measuring means. Tanaka et al. and Noyes et al. do not disclose expressly using a light emitting element for the density measuring means. Terajima et al. disclose wherein said density measuring means includes a light emitting element for illuminating said recorded portion, and a light receiving element for converting the reflected light into an electric signal (col. 1, lines 15-20). Tanaka et al., Noyes et al., and Terajima et al. are combinable because they are from the same field of printing systems. At the time of the invention it would have been obvious to implement the light emitting element into the density measuring means of the combination of Tanaka et al. and Noyes et al. The motivation for doing so would have been to reduce the power consumption present in other density measuring means and because of the conventionality of such devices. Therefore, it would have been obvious to obtain the invention as specified in claim 9.

13. Claims 24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720, Komiya et al. U.S. Patent 6,287,027, and Ui et al. U.S. Patent 6,340,984.

Referring to claim 24, Schantz discloses a serial printer including a carriage reciprocated in a sub-scanning direction which is a width direction of a recording material, a recording head held by said carriage, and moving means for moving said

recording material in a main-scanning direction perpendicular to said sub-scanning direction, said recording head recording a predetermined number of rows on said recording material in accordance with image data during the reciprocation of said carriage, said serial printer comprising: image-area detecting means for obtaining positional information (rows between print elements) of an image area of said recording material already recorded (detector 24 of Fig. 1, col. 3, lines 37-45); data making means for making correction image data by calculating positional difference between said positional information of said image area and positional information of said image data, said data making means moving said image data in accordance with said positional difference (print controller 34 of Fig. 1, col. 3, lines 46-55); and record correcting means for performing correction recording relative to said defective portion (paper motion control device 24 of Fig. 1, col. 3, lines 59-64), said record correcting means moving said carriage again for the defective portion and driving said recording head in accordance with said difference during the movement of said carriage (col. 3, lines 24-34), wherein, on said recording material, the operation means obtains the density difference of the defective portion and the record correcting means performs correction recording. Schantz does not disclose expressly calculating an inclination or comparing a measured density with a predicted density. Ui et al. disclose calculating an inclination and inclining image data in accordance with said inclination (col. 7-8, lines 55-67, 1-12). Schantz and Ui et al. are combinable because they are from the same field of printing systems. At the time of the invention it would have been obvious to correct inclination of a printed page. The motivation for doing so would have been to eliminate printing

pages that are printed on an undesired angle. Komiya et al. disclose density predicting means for obtaining a predicted density to be recorded on each portion of said image area, based on said image data (density nonuniformity detection chart 81 of Fig. 8, col. 9, lines 56-58); density measuring means attached to said carriage and for obtaining a measured density of said portion of said image area during the movement of said carriage (density nonuniformity amount detection unit 38 of Fig. 6, col. 9, lines 24-27); operation means for comparing said measured density with said predicted density every portion, said operation means obtaining density difference of the defective portion having said measured density which is less than said predicted density (density nonuniformity calculation unit 37 of Fig. 6, col. 9, lines 24-27). Schantz and Komiya et al. are combinable because they are from the same field of printing systems. At the time of the invention it would have been obvious to correct density on a printed page. The motivation for doing so would have been to improve image quality by eliminating printing nonuniformity. Therefore, it would have been obvious to combine Ui et al. and Komiya et al. with Schantz to obtain the invention as specified in claim 24.

Referring to claim 35, Schantz discloses measuring the positional difference between the image area and the image data (print controller 34 of Fig. 1, col. 3, lines 46-55). Schantz does not disclose expressly basing the positional data on a slanted insertion of the recording material. Ui et al. disclose wherein the recording material having the image area is slanted when inserted in the serial printer, and inclination is determined (col. 4, lines 28-46). Schantz and Ui et al. are combinable because they are from the same field of printing systems. At the time of the invention it would have been

obvious to base the positional difference on the inclination of the sheet. The motivation for doing so would have been to eliminate the error that would occur if the measured positional difference were based on a slanted sheet. Therefore, it would have been obvious to combine Ui et al. with Schantz to obtain the invention as specified in claim 35.

14. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720, Komiya et al. U.S. Patent 6,287,027, and Ui et al. U.S. Patent 6,340,984 as applied to claim 24 above, and further in view of Noyes et al. U.S. Patent 6,297,888.

Referring to claim 25, Schantz discloses measuring means, but does not disclose expressly measuring a border. Noyes et al. disclose wherein said image-area detecting means detects a border line between said image area and its surrounding portion by using said density measuring means to detect said image area, under a condition of moving said carriage and moving said recording material by said moving means (col. 15, lines 38-40). Schantz and Noyes et al. are combinable because they are from the same field of printing systems. At the time of the invention it would have been obvious to measure a border with density measuring means. The motivation for doing so would have been to reduce the inaccuracy in printing alignment patterns. Therefore, it would have been obvious to combine Noyes et al. with Schantz to obtain the invention as specified in claim 25.

Referring to claim 26, Schantz discloses a serial printer according to claim 24, wherein said image-area detecting means detects a border line between said image area and its surrounding portion by using said measuring means to detect said image area, under a condition of moving said carriage and moving said recording material by said moving means (col. 3, lines 37-45). Komiya et al. disclose measuring density (density nonuniformity amount detection unit 38 of Fig. 6, col. 9, lines 24-27).

15. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz U.S. Patent 5,124,720 as applied to claim 20 above, and further in view of applicant's admitted prior art.

Schantz discloses a serial printing method for recording an image on a recording material according to claim 20 but does not disclose expressly when the broken element is detected, a determination is made whether said broken element is for recording an end row of a line, and when said broken element records the end row of said line, recording is performed with fifty-percent density. Applicant's prior art teaches when the broken element is detected, a determination is made whether said broken element is for recording an end row of a line, and when said broken element records the end row of said line, recording is performed with fifty-percent density (page 38, lines 3-10). At the time of the invention it would have been obvious to detect the end of a row and record said row with fifty percent density. The motivation for doing so would have been to eliminate the streak that occurs between adjacent lines. Therefore, it would have been

obvious to combine the applicant's admitted prior art with Schantz to obtain the invention as specified in claim 33.

16. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. U.S. Patent 6,123,341 and Noyes et al U.S. Patent 6,775,022 as applied to claim 7 above, and further in view Schantz U.S. Patent 5,124,720.

Tanaka et al. disclose a measured density of a recorded portion, obtaining a predicted density to be recorded on said portion, and performing correction recording to the defective portion but does not disclose expressly the steps occurring during a same recording operation. Schantz discloses detecting a print defect and correcting a print defect during the same recording (col. 3, lines 24-34). Tanaka et al. and Schantz are combinable because they are from the same field of substituting for defective printing elements. At the time of the invention it would have been obvious to detect a print defect and correct a print defect in the same recording. The motivation for doing so would have been to immediately detect print defects and correct them without having to utilize a separate process of finding printing defects. Therefore, it would have been obvious to combine Schantz with Tanaka et al. to obtain the invention as specified in claim 37.

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter K. Huntsinger whose telephone number is (571)272-7435. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on (571)272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PKH

DOUGLAS Q. TRAN
PRIMARY EXAMINER